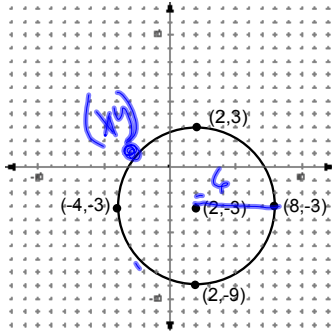


8-3 Circles

Circle—the set of all points, in a plane, a given distance (radius) from a fixed point (center)



$$r = \sqrt{(x-2)^2 + (y-3)^2}$$

$$r^2 = (x-2)^2 + (y-3)^2$$

Equation of Circle

$$r^2 = (x - h)^2 + (y - k)^2$$

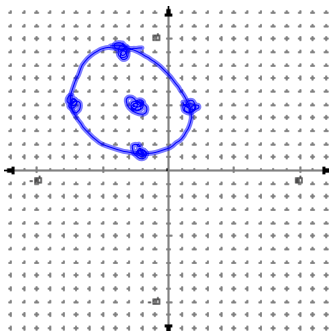
$r \rightarrow$ radius

$C(h, k)$
Center

Find the equation of a circle with $C(-2, 5)$ and $r = 4$.

$$16 = (x + 2)^2 + (y - 5)^2$$

Graph it.



Find the center and radius.

$$1. x^2 + y^2 - 16 = 0$$

$$x^2 + y^2 = 16$$

$C(0, 0)$
 $r = 4$

Find the center and radius.

$$2. \ x^2 + y^2 + 8y = 0 \quad C(0, -4) \\ r = 4$$

$$x^2 + y^2 + 8y + 16 = 16 \\ x^2 + (y+4)^2 = 16$$

Find the center and radius.

$$3. \ x^2 + y^2 - 4x + 2y - 4 = 0$$

$$x^2 - 4x + 4 + y^2 + 2y + 1 - 4 = 0 \\ (x-2)^2 + (y+1)^2 = 9 \\ C(2, -1) \quad r = 3$$

Find the center and radius.

$$4. \ x^2 + y^2 + 3x + 4y = 0$$

$$x^2 + 3x + \frac{9}{4} + y^2 + 4y + 4 = \frac{9}{4} + 4 \\ \left(x + \frac{3}{2}\right)^2 + (y+2)^2 = \frac{25}{4} \\ r = \frac{5}{2} \quad C\left(-\frac{3}{2}, -2\right)$$

General Form

$$x^2 + y^2 + ax + by + c = 0$$

$$a, b, c \in \text{Real}$$

Find the equation a circle with C(2, -1) that goes through (5, 3)

$$\begin{aligned}
 r^2 &= (x-h)^2 + (y-k)^2 \\
 r^2 &= (x-2)^2 + (y+1)^2 \\
 r^2 &= 9 + 16 \\
 r^2 &= 25 \\
 25 &= (x-2)^2 + (y+1)^2
 \end{aligned}$$

Find the equation a circle with C(4, 3) that goes through (8, 12)

$$(x-4)^2 + (y-3)^2 = 97$$

Find the equation a circle with diameter endpoints (-5, -1) and (-1, -1)

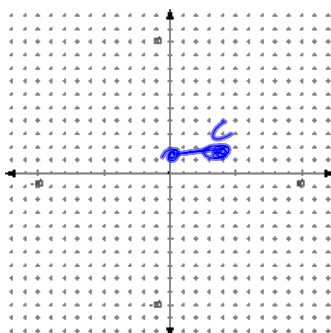
$$\begin{aligned}
 &\text{Midpt} \\
 C &= \left(\frac{-5-1}{2}, \frac{-1-1}{2} \right) \\
 C &= (-3, -1) \\
 C &= (-3, -1) \\
 (x+3)^2 + (y+1)^2 &= r^2
 \end{aligned}$$

Find the equation a circle with diameter endpoints (3, -4) and (7, 2)

Find the equation a circle, whose center is in quadrant I, with a radius of 3 and is tangent to the y-axis at (0, 2).

$$C(3, 2)$$

$$9 = (x-3)^2 + (y-2)^2$$



HW

p429-430

16, 17, 19-21, 24, 27, 33, 34, 39, 43, 47